September 24, 1998

Mr. David Bennett
United States Environmental Protection Agency
1200 Sixth Avenue, Mail Stop ECL-115
Seattle, Washington 98101

Re: Contract No. 68-W6-0008
TDD No. 98-02-0009

Dear Mr. Bennett:

Enclosed please find a copy of the Final Non-Sampling Site Inspection (NSSI) Report for the Lebanon Area Groundwater, located in Lebanon, Oregon. To evaluate the potential impact of the groundwater plume, the NSSI focused on characterization of the groundwater pathway.

If you have any questions regarding this deliverable, please call me at 206/624-9537.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Linda Foster
Project Leader

Enclosures

cc: Gary Sink, USEPA, Seattle, Mail Stop ECL-116 (letter only)
Charlie Gregory, E&E, Seattle

Lebanon Area Groundwater
Final Non-Sampling Site Inspection Report

TDD: 98-02-0009

Contract: 68-W6-0008
May, 1999

Region 10

START

Superfund Technical Assessment and Response Team

Submitted To: David Bennett, Task Monitor
U.S. Environmental Protection Agency
1200 Sixth Avenue
Seattle, WA 98101

FINAL NON-SAMPLING SITE INSPECTION REPORT
LEBANON AREA GROUNDWATER
LEBANON, OREGON

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LIST OF ACRONYMS & ABBREVIATIONS

Acronym	Definition
1,1,2-TCA	1,1,2-Trichloroethane
1,2-DCA	1,2-Dichloroethane
1,2-DCB	1,2-Dichlorobenzene
1,2-DPA	1,2-Dichloropropane
c-1,2-DCE	cis-1,2-Dichloroethylene
c-1,3-DPE	cis-1,3-Dichloropropene
LAG	Lebanon Area Groundwater
DBCM	Dibromochloromethane
DCE	Dichloroethylene
DCM	Methylene Chloride
DEQ	Oregon Department of Environmental Quality
DNAPL	Dense Non-Aqueous Phase Liquids
EDB	Ethylene Bromide
E & E	Ecology and Environment, Inc.
EPA	U.S. Environmental Protection Agency
MCL	Maximum Contaminant Level
NGVD	National Geodetic Vertical Datum
NSSI	Non-Sampling Site Inspection
OHD	Oregon Department of Human Resources, Health Division
PCE	Tetrachloroethylene
ppb	parts per billion
QA/QC	quality assurance/quality control
START	Superfund Technical Assessment and Response Team
TCA	Trichloroethane
TCE	Trichloroethylene
TCM	Chloroform
VOC	Volatile Organic Compounds

1. INTRODUCTION

Ecology and Environment, Inc., (E & E) was tasked by the U.S. Environmental Protection Agency (the EPA) to provide technical support for the completion of a Non-Sampling Site Inspection (NSSI) at the Lebanon Area Groundwater (LAG) site, located near Lebanon, Oregon. E & E conducted NSSI activities under Technical Direction Document No. 98-02-0009, issued under the EPA Region 10 Superfund Technical Assessment and Response Team (START) Contract Number No. 68-W6-0008. The following specific goals for the NSSI are:

Provide the EPA with adequate information to determine whether the site is eligible for placement on the National Priorities List;

Determine off-site migration of contaminants; and

Document a threat or potential threat to public health or the environment posed by the site.

Activities conducted as a part of this NSSI included reviewing previous information concerning the site, and preparing NSSI report summarizing the findings. The NSSI sampling event was intended to be a limited investigation of certain potential on-site contaminant sources, migration pathways, and environmental receptors at or near the site.

This document discusses background information regarding the LAG site and its vicinity (Section 2), describes areas of contamination and potential sources (Section 3), discusses migration exposure pathways and targets (Section 4), summarizes investigation findings and conclusions (Section 5), and lists references (Section 6).

2. SITE BACKGROUND

2.1 SITE LOCATION

Site Name:	Lebanon Groundwater Contamination
CERCLIS ID No.:	ORD987202371
Location:	Linn County
	Lebanon, Oregon
Latitude Range:	44 32' 22.0" North to 44 32' 49.6" North
Longitude Range:	122 54' 09.9" West to 122 54' 10.9" West
Legal Description:	Township 12 South, Range 2 West, Sections 10 and 11 (Willamette Meridian)
Congressional District:	Fourth District
Site Contact :	David Anderson Oregon Department of Environmental Quality (DEQ) Waste Management and Cleanup Division 811 SW Sixth Avenue Portland, OR 97204 (503) 229-5428 FAX: (503) 229-6954

2.2 SITE DESCRIPTION

Lebanon, Oregon, the second largest city in Linn County, is located along Federal Highway 20, 12 highway miles southeast of the city of Albany (Figure 2-1).

The local economy is based largely upon forestry/wood products and agriculture, with some specialized manufacturing industries.

Surface elevations across the downtown business district range from 348 feet above the National Geodetic Vertical Datum (NGVD) in the south (near the intersection of South Park and East Oak Streets) to 340 feet above NGVD in the north (near the intersection of South Second and Academy Streets). Slope is generally to the north and northwest at 2.3 to 2.9 percent (Hart Crowser 1998).

The city is located on the eastern edge of the broad, terraced Lebanon-Albany Plain. The 100-square-mile plain slopes uniformly northwest (11 feet per mile) from the Cascade Mountain foothills along the Lower Santiam River near Lebanon to the Willamette River near Albany. Cascade Mountain foothills generally border the area to the east and south. Peterson Butte (elevation 1431 feet) lies 3.5 miles to the southwest. Ridgway Butte (elevation 1203 feet) lies one mile to the east-southeast, directly across the South Santiam River (Hart Crowser 1998).

The area to the north, northwest, and west (over 75 square miles) consists of tracts of agricultural land chiefly used for production of grass seed (rye grass), small grains (winter wheat) and hay, although some acreage is used as pasture or for the production of nut and orchard crops (filberts, hazelnuts, peaches, apples), berries, vegetables [sweet corn, pole beans, melons], nursery products (ornamentals), and Christmas trees. Approximately 550 acres of agricultural lands to the north (along the South Santiam and Santiam Rivers) is irrigated with river water, while lands to the northwest and west are largely not irrigated (Hart Crowser 1998).

A plume of contaminated groundwater has been discovered in the northwest portion of the city of Lebanon. The plume is bordered by Harrisson Street to the north, Oak Street to the south, 11th Street to the west, and Grove Street to the east (see Figure 2-1 and 2-2). The plume covers approximately 4,500 feet by 4,500 feet or approximately 466 acres (approximately 12 blocks by 12 blocks or 144 city blocks).

Groundwater in northwest Lebanon has been contaminated with chlorinated solvents. The primary contaminant of concern is tetrachloroethylene (PCE, also know as perchloroethlyene), although at least 13 other halogenated solvents have been detected (ODEQ 1994).

The plume area is generally residential with several small businesses present. Many businesses located within and around the plume have been identified as potential sources in the 1994 *Preliminary Assessment* report prepared for ODEQ (1994). Table 2-1 summarizes these potential sources.

2.3 CONTAMINANTS OF CONCERN

Volatile Organic Compounds (VOCs), primarily halogenated solvents, have been detected in groundwater samples collected from monitoring wells, domestic wells, and Geoprobe™ locations in the Lebanon Area. The primary contaminant of concern in Lebanon's groundwater is PCE although, as of September 1994, thirteen other halogenated solvents have also been detected, including:

Trichloroethylene (TCE)
1,1,1-Trichloroethane (TCA)
Chloroform (TCM)
Trichlorofluoromethane
cis-1,2-Dichloroethylene (c-1,2-DCE)
Methylene Chloride (DCM)
1,1,2-Trichloroethane (1,1,2-TCA)
1,2-Dichloroethane (1,2-DCA)
cis-1,3-Dichloropropene (c-1,3-DPE)
1,2-Dichloropropane (1,2-DPA)
Dibromochloromethane (DBCM)
Ethylene Bromide (EDB)
1,2-Dichlorobenzene (1,2-DCB)

Many of these are considered Class B (probable human) carcinogens.

PCE is most commonly used in dry-cleaning operations. Stoddard solvent was a common dry-cleaning solvent until the late 1950s to early 1960s when, because of concerns about its flammability, it was largely replaced by perchloroethylene. TCE, carbon tetrachloride, and trichlorotrifluoroethane have also been used in the dry cleaning industry, although not as extensively as PCE. PCE has also been used in carpet-cleaning operations, but has largely been replaced by water-based formulas because of the solvent's cost and difficulty of recovery. PCE is also used as a cleaner and degreaser in the printing and graphic arts industries, metals manufacturing and fabrication industry, automotive maintenance, repair and general machine shop operations, and for degreasing electrical parts. DCM, carbon tetrachloride, dichlorobenzene, TCE, and TCA all find similar applications in metals cleaning and surface preparation (ODEQ 1994).

When released to groundwater in sufficient quantity, halogenated hydrocarbons behave as Dense Non-Aqueous Phase Liquids (DNAPLs). Groundwater contaminant levels detected in Lebanon thus far do not suggest the presence of a non-aqueous phase in the local aquifers; detected levels have been far below the level of saturation (ODEQ 1994).

2.3.1 Degradation Products of PCE

Three compounds formed by degradation of PCE result from the successive removal of chlorine ions from the PCE chemical structure (reductive dehalogenation). This process typically produces TCE, the isomers of DCE (more typically the isomer cis-1,2-DCE), and vinyl chloride. Figure 2-3 illustrates the conceptual transformation of TCE, PCE, and other chlorinated aliphatic hydrocarbons. TCE and cis-1,2-

DCE (but not vinyl chloride) have been detected in a number of the residential wells in Lebanon, including wells, 2, 5, 24, 89, W2, W4, W7, W11, W17, J18, J50, J61, J68, J69, and J74. TCE and/or DCE were also detected in monitoring wells MW-11, MW-3D, JW-2A, and JW-3. For wells where these compounds have been detected during a number of monitoring events, the data generally show a slight increasing trend in concentrations, suggesting that natural degradation is occurring (Hart Crowser 1998).

2.4 SITE INVESTIGATIONS

As directed by the EPA, the START personnel completed this NSSI without a site reconnaissance visit. The following section outlines the investigations conducted to date as part of the overall Lebanon Area-wide Groundwater Investigation. Some of the information provided here has been excerpted directly from the April 13, 1998, Lebanon Area-Wide Groundwater Monitoring Report prepared for ODEQ.

Late 1980s/1990. PCE was detected in one of the City of Lebanon's irrigation wells (Well 52) at a concentration of 15.0 parts per billion (ppb). The Federal Maximum Contaminant Level (MCL) for PCE in drinking water is 5 ppb. The City of Lebanon historically provided drinking water from a surface water intake along the Lebanon-Santiam Canal and was exploring the development of a groundwater wellfield to supplement the existing municipal drinking water supply.

According to one source (Hart Crowser 1998), the initial discovery of PCE in the groundwater in the Lebanon area occurred in the late 1980s; according to another source (ODEQ 1994) it was August 1990.

May 1990 through May 1991. The Oregon Department of Human Resources Health Division (OHD) conducted a number of sampling events to investigate the presence of PCE in the Century Park well and other wells in the vicinity. During this period, PCE concentrations in samples collected from the Century Park well ranged from 1.6 g/L to 15 g/L. The results of the OHD study are included in the Phase 1 Groundwater Assessment Report (PRC 1993).

June 1993. The DEQ sampled 28 wells. PCE was detected in 14 of the 28 wells at concentrations ranging up to 43.2 g/L (well 2). The results of this investigation are included in the Phase 1 Groundwater Assessment Report (PRC 1993).

December 1993. The DEQ investigated shallow groundwater contamination using Geoprobe™ equipment. PCE and TCE were detected in shallow groundwater in several locations in the downtown area. PCE concentrations ranged up to 67.2 g/L. Two separate PCE plumes were identified. The results of these investigations are included in the Phase 2 Groundwater Assessment Report (PRC 1994a).

February 1994. Groundwater samples were collected from 29 residential wells. VOCs were detected in 16 of the 29 wells. PCE and TCE concentrations ranged up to 120 g/L and 7.3 g/L, respectively. The results of this investigation are included in the Phase 3 groundwater assessment report (PRC 1994b).

June 1994. The DEQ sampled 64 domestic wells. PCE was detected in 10 of the wells sampled at concentrations ranging up to 232 g/L. The results of this investigation are included in a DEQ technical memorandum (DEQ 1994).

Winter and Spring 1995. The DEQ installed 4 well clusters (for a total of 10 wells) near suspected sources of PCE contamination. The 10 new monitoring wells were sampled together with 28 domestic wells. The DEQ also conducted additional investigations to collect shallow groundwater samples at 76 Geoprobe™ locations in the downtown area. The results indicated VOCs, primarily PCE and TCE, were widely distributed in groundwater at concentrations above the MCLs within the downtown area and in residential areas to the west and north of downtown. The results of these investigations are included in the Groundwater Quality Assessment Report (PRC 1995).

May 1997. On May 20 and 21, 1997, the DEQ and a consultant performed groundwater monitoring in the City of Lebanon. This groundwater monitoring event included collection of groundwater samples from 36 domestic wells, one former municipal well, and 17 groundwater monitoring wells. The groundwater monitoring wells were located at four well clusters and at two dry cleaner sites in downtown Lebanon. The results of this investigation are summarized below and further detail can be found in the *Lebanon Areawide Groundwater Monitoring Report* (Hart Crowser 1998).

PCE and other VOCs were detected in 17 of the 36 domestic wells, in the one former municipal well, and in nine of the 17 monitoring wells sampled. Detected PCE concentrations ranged from 0.7 g/L to 181 g/L, and detected TCE concentrations ranged from 0.6 g/L to 7.3 g/L. The MCL for both PCE and TCE is 5 g/L. PCE concentrations exceeded the MCL in nine domestic wells and six monitoring wells. TCE concentrations exceeded the MCL in two domestic wells, only: Well # 2 at 5.2 g/L and well W2 at 7.3 g/L (Hart Crowser 1998).

Based on information provided by well owners, it appears that four of the nine domestic wells in which PCE concentrations exceeded the MCL are being used for drinking water. These wells include 72, 73, W2, and W17 for which PCE concentrations were 94.0, 143.0, 67.5, and 23.6 g/L, respectively (Hart Crowser 1998). The analytical data for these wells and the other wells sampled in May 1997 are generally consistent with data from previous sampling events. Tables 2-1 and 2-2 present historical VOC results for the domestic wells and the monitoring wells, respectively.

2.5 SUMMARY OF GROUNDWATER DATA

The most recent groundwater samples were collected in May 1997, as described in the previous section. The report for this sampling event included data tables (included as Tables 2-2 and 2-3) summarizing laboratory results for samples collected from domestic wells and monitoring wells since August 1990. A review of these tables indicates that a total of 252 samples have been collected from 147 different wells since 1990. The 217 samples collected from 130 domestic water wells and the 35 samples collected from 17 monitoring wells were analyzed for VOCs by EPA Method 8260, which includes PCE.

In addition, three monitoring well samples collected in May 1997 also were analyzed for Stoddard Solvent (Hart Crowser 1998). Results are summarized in Table 2-4

Of the 252 samples collected, PCE was detected in 97 samples and exceeded the MCL of 5.0 g/L in 67 samples. For samples in which PCE was detected, the average concentration was 30.3 g/L. The highest concentration was 232 g/L in the sample collected from the domestic well at 348 West Grant Street in June 1994. Data from the May 1997 sampling event show concentrations of PCE in excess of the MCL in 15 of the 54 samples submitted and concentrations of TCE in excess of the MCL in two of the samples submitted. The highest concentration of PCE for samples collected May 1997 was 181 g/L, also from 348 West Grant Street.

Table 2-1

SUMMARY OF POTENTIAL SOURCES OF GROUNDWATER PCE CONTAMINATION
LEBANON AREA GROUNDWATER PLUME
LEBANON, OREGON

No.	Site Name/Address	Comments
1.	Domestic Well 315 East Olive Street Lebanon, OR	DEQ sampled in Dec. 1989 responding to complaints dating to 1983. Owner concerned about nearby landfill. Results: PCE 4 ppb and chloroform 6 ppb.
2.	James River II Landfill Santium Canal Industrial Park Lebanon, OR	Previously a Crown Zellerbach (CZ) paper mill. Acquired by James River II 1986. EPA performed a PA in 1988. CERCLIS No. 000858274. SI conducted (1994) under Order on Consent ECSR-WVR-89-08. CZ known to have used TCA. PA identified TCE as a substance of concern. PCE 1.8 to 4 ppb, 1, 2-DCE 6 ppb, chloromethane 3 ppb, chloroethane 1 ppb.
3.	Primasing Motors, Inc. 1211 South Main Street Lebanon, OR	Car sales, service and parts. LUST #22-89-4167. TPH and 4 chlorinated hydrocarbons detected below MCLs.
4.	National Guard Maintenance Facility 36346 Oak Drive Lebanon, OR	Located at the south west corner of the Lebanon Airport. LUST #22-90-4091, 22-89-4016. TPH, BTEX, and lead. PCE 6-14 ppb, 1,2-DCA 2-41 ppb, TCE 1-ppb, methylene chloride 5 ppb.
5.	Georgia - Pacific Lebanite Hardboard Plant 37680 River Road Lebanon, OR	Routine sampling of onsite drinking water supply well: Chloroform 14.5 ppb Cromodichloromethane 5.4 ppb Dibromochloromethane 3.9 ppb Carbon tetrachloride 1.0 ppb
6.	McCollum Automotive Service Center 2020 S Santiam Hwy. Lebanon, OR	Acquired by Friendship Ford 1992. 1991 LUST #22-91-4131, involving leaking gasoline UST, leaking waste oil UST, and leaking hydraulic lift. PCE 81 ppb in excavated soils, 1,1,1-TCA 1-2 ppb, chloroform 3 - 18 ppb, methylene chloride 1 ppb may have been lab contaminant.
7.	John Sportsman Property Lebanon, OR	To the west of McCollum Automotive. 12 to 15 abandoned unmarked drums. 8 leaking. Speculated to be waste oil and waste antifreeze. 10 cubic yards excavated. GW encountered; no contamination per analysis.
8.	Johannsen Cleaners 910 South Park Street Lebanon, OR	Located at the SE edge of the downtown business district. Business also previously located at 868 South Main in Lebanon. Approx. 100 gallons of PCE used each year. Approx. 120 gallons stored on site. Also has a 50 gallon capacity indoor storage. A solvent recovery system was installed circa 1989. Recovery is less than 5 gallons in a two year period which appears low. Water from the system is discharged to city sewer lines. Complaint circa 1993 about a solvent smell in sewer line next to facility. 1993 - a 1-inch pipe was observed discharging a clear liquid to the ground. Not sampled.
9.	Other Cleaning Operations Various addresses Not available	Review of phone books back to 1933 - at least 24 dry cleaning, carpet cleaning, or building maintenance locations within 1 mile of the contamination area.
10.	Alley's Auto and Truck Parts 125 West Sherman Street Lebanon, OR	Complaint filed alleging discharge of used oil to soils behind business, draining hot tank to the storm drain, and discharging solvents to the floor drain. There is no record indicating follow-up by DEQ.

Table 2-1

SUMMARY OF POTENTIAL SOURCES OF GROUNDWATER PCE CONTAMINATION
LEBANON AREA GROUNDWATER PLUME
LEBANON, OREGON

No.	Site Name/Address	Comments
11.	Research Manikins 315 West Sherman Street Lebanon, OR	Taxidermy cast and mold manufacturer. Acetone and methylene chloride used in clean up generally allowed to evaporate. Small quantities discarded in dumpster. Complaint #3822, 5/29/91, alleges uncured fiberglass resin, curing catalyst, catalyst containers, acetone, laquer thinner, and used methylene chloride deposited in dumpsters. Complaint #2701, 2/22/88, alleges company sells empty barrels for burning that actually contained up to 3 inches of a product containing 14.4 percent trichlorofluoromethane. Site manager now drip-dries drums over a catch basin.
12.	Two Mac Enterprises 315 West Sherman Street Lebanon, OR	Until approx. 1993, Two Mac occupied the same building as Research Manikins. Business owners state facility only used for storage. Individuals at two neighboring businesses indicate the site was used for logging equipment/ machinery fabrication and portable sawmill operations. In May 1993, scrapped machinery, a number of drums, and petroleum staining were observed.
13.	Lebanon Public School District Bus Maintenance Facility 485 South Fifth Street Lebanon, OR	Directly North of Two Mac and Research Manikins. LUST #22-91-4265 removed 1 gasoline tank, 1 diesel tank, 1 waste oil tank, groundwater contaminated with BETX, no analysis for chlorinated solvents.
14.	Vacant Lot at the Southeast corner of South Third and West Ash Streets Lebanon, OR	Aerial photograph (1971) suggest this lot may have been used for drum storage. Individuals interviewed have no recollection of the site being used for drum storage. The site was formerly a Ford/New Holland tractor dealership. Currently the site is a gravel lot used for parking for a church and tar roofing equipment (All J's Roofing).
15.	C & M Investments 910 S Main Street 1205 S Main Street Lebanon, OR	Two properties, former service stations, located 0.15- and 0.35- miles south of southeast corner of the groundwater contamination area. Eight tanks were removed from 1205 S Main, nine removed from 910 S Main. Each site also had a 250-gallon capacity waste oil tank and four unidentified 150-gallon tanks. At the time of decommissioning, the 4 unidentified tanks at 910 S Main Street site contained waste oil. However, historic information indicates they were once used for solvents. No soil contaminants detected at 910 S Main Street. Gasoline-contaminated soil and ground water detected at 1205 S Main.
16.	Floor Krafters of Lebanon, Inc. 508 South Main Street Lebanon, OR	A carpeting and floor covering retailer located at the site of a former service station. In 1991, (LUST #22-91-4237) weathered gasoline was detected below the building, no soil cleanup has been conducted. No chlorinated solvent analyses conducted.

Table 2-1

SUMMARY OF POTENTIAL SOURCES OF GROUNDWATER PCE CONTAMINATION
LEBANON AREA GROUNDWATER PLUME
LEBANON, OREGON

No.	Site Name/Address	Comments			
17.	Various Underground Waste Oil Tanks	Tank Owner	Tank Size	Tank Use	Status
	395 Tangent	Miller's Exxon	1 x 200-gal	Waste Oil	Removed
	211 S. Main	Tom Plinski	2 unk. cap.	Unknown	Inert Fill
	900 S. Ninth	Jack Thomas Motors	1 unk. cap.	Waste Oil	Removed
	1050 W. Oak	Lebanon Fire Dept.	1 x 975-gal	Waste Oil	Removed
	643 S. Park	Lebanon Texaco	1 x 550-gal	Waste Oil	In Use
	485 S. Fifth	Lebanon School Dist.	1 x 500-gal	Waste Oil	Removed
	1700 S. Fifth	Lebanon High School	1 x 500-gal	Waste Oil	Removed
	1211 S. Main	Primasing Motors	1 x 500-gal	Waste Oil	Removed
	36346 Oak Drive	Oregon Military Dept.	1 x 1200-gal	Waste Oil	Removed
	36346 Oak Drive	Oregon Military Dept.	1 x 675-gal	Waste Oil	Removed
	910 S. Main	C&M Investments	1 x 250-gal	Waste Oil	Removed
	910 S. Main	C&M Investments	4 x 150-gal	Solvents?	Removed
	1205 S. Main	C&M Investments	1 x 250-gal	Waste Oil	Removed
	1205 S. Main	C&M Investments	4 x 150-gal	Unknown	Removed
	300 N. Main	Leathers Oil	2 unk. cap	Waste Oil	Removed
	2020 S Santiam Hwy	McCollum Automotive	1 x 550-gal	Waste Oil	Removed
18.	Emark, Inc. 250 N Hansard Avenue Lebanon, OR	Emark, Inc., also known as Entek Manufacturing, Inc, is a Large Quantity Hazardous Waste Generator and has operated at the site since 1987. Emark uses TCE to wash manufactured battery separators. Has generated 1,1,1-TCA wastes. March 28, 1992, Emark accidentally discharged 40-gallons of dilute chromic acid solution to its oil/water separator, and subsequently to the Lebanon sewer system (3,000-ppm chromium; 2700-ppm hexavalent chromium). On July 29, 1992, Emark reported that approximately 3-pints of TCE was released to a blacktopped area, immediately cleaned up the spill, removed portions of the blacktop and underlying contaminated soils. The 1992 Fuel Consumption Summary was in error: ending TCE inventory was in error by 165 gallons. Three empty TCE drums had been discovered within their solvent storage area, accounting for the initially under reported quantity.				
19.	Linn Gear Company Lebanon, OR	Located immediately east of Emark. Air monitoring data suggests there may be chloroform and carbon tetrachloride emissions at Linn Gear.			
20.	Willamette Industries' Lebanon Plywood Facility 800 East Milton Street Lebanon, OR	February 1987 complaint # 2423 alleged that plywood patch compound barrels were being crushed and buried at the landfill. DEQ followup indicated that drums were being "neutralized" by detergent washing prior to burial. Acquired by Lumbertech in June 92.			
21.	Willamette Industries' Snow Cap Landfill Lebanon, OR	Willamette Industies' Snow Cap Landfill old log pond (unlined) was used for burial of woodwastes 1987, 1988. Located along the east side South Santiam River, 4 miles downstream from the city of Lebanon, impact to Lebanon groundwater seems unlikely.			
22.	City of Lebanon's Landfill 33300 Brewster Road Lebanon, OR	Located directly across the river from the mouth of Mark's Slough			

Table 2-1

SUMMARY OF POTENTIAL SOURCES OF GROUNDWATER PCE CONTAMINATION
LEBANON AREA GROUNDWATER PLUME
LEBANON, OREGON

No.	Site Name/Address	Comments
23a.	Champion International 3213 South Santiam Highway Lebanon, OR	Large (182-acre) plywood mill (CERCLIS Number 009026170). In 1985 it was subdivided: 132 acres to Freres Lumber Company, 50 acres to U.S. Plywood. U.S. Plywood sold its parcel to Georgia Pacific Corporation (Lebanite Hardboard Plant). Wastes from plywood manufacture and battery separator are believed to have been buried in a landfill (0.3 miles further southeast) located on an island in Cheadle Lake. Wastes are believed to have included spent solvents, glue wastes, ingnitable wastes, corrosive wastes, and wood preservatives. Waste halogenated solvents (F002) are known to have been generated at an on-site coating operation. PA of Champion International (ORD 981766215) 1987, recommending a follow-up Site Inspection. Substances of concern: pentachlorophenol, sodium cyanide, coating sludges, paint and lacquer residuals, pentachlorophenol sludge, wood patch filler, resorcinol, methyl ethyl ketone, toluene, 1,4 dioxane, alcohols, phenols, paint thinners, and transformer oil. PA addendum for Champion International also addressed operations at the same site by Lebanon Plywood, Incorporated (ORD 009026170).
23b.	Georgia Pacific Corp. (Lebanite Hardboard Plant) 3213 South Santiam Highway Lebanon, OR	Site Inspection (SI) of Georgia-Pacific Lebanite Hardboard Plant (CERCLIS Number 987174570) in 1991 substances of concern include spent halogenated solvents, non-halogenated solvents, corrosive solid wastes, ignitable wastes, and wood preservatives. No further federal action was recommended for Georgia-Pacific.
23c.	Freres Lumber 3213 South Santiam Highway Lebanon, OR	Further investigation of the Freres Lumber Company was warranted. Asbestos removed 1990, PCB-containing transformers removed 1991. A risk assessment of surface water and sediments in log pond was performed. No organic contaminants were detected. SI was performed in 1992 (CERCLIS Number 009026170). PA equivalent 1993 recommending further investigation of Cheadle Lake. Freres Lumber Company signed “Intent to Participate” in November 1993.

Source: ODEQ 1994

Table 2-2

VOLATILE ORGANIC COMPOUNDS RESULTS - DOMESTIC WELLS
LEBANON AREAWIDE GROUNDWATER MONITORING
LEBANON, OREGON

Well #	Well Address	Well Depth in Feet	Well Sampling Date	VOC (EPA Method 8260) Concentrations in µg/L							Water Bearing Zone
				PCE	TCE	TCA	DCE	Trichlorofluoro-methane	Chloroform	Other1	
1	145 W. Ash St.	79	6/93	3.6	ND	20.0	ND	28.0	ND	ND	Deep
			2/94	2.3	ND	13.4	ND	21.2	ND	ND	
			4/95	1.5	ND	2.1	ND	4.9	ND	ND	
			5/97	ND	ND	ND	ND	ND	21.2	1.0	
2	339 S. 2nd St.	69	6/93	43.2	4.2	0.7	1.2	2.3	ND	ND	Deep
			4/95	39.3	4.1	2.2	1.8	4.1	ND	ND	
			5/97	49.1	5.2	ND	2.1	1.1	ND	ND	
4	1191 S. Fifth St.	47	5/97	ND	ND	ND	ND	ND	ND	ND	Intermediate
5	818 S. 5th St.	57	2/94	120.0	3.9	ND	1.9	ND	ND	ND	Intermediate
			4/95	115.0	3.4	ND	2.0	ND	0.8	ND	
6	305 S. 5th St.	70	6/93	ND	ND	ND	ND	ND	ND	ND	Deep
			5/94	ND	ND	ND	ND	ND	ND	ND	
			5/97	ND	ND	ND	ND	ND	ND	ND	
8	291 . 7th St.	95	12/90	33.9	ND	ND	ND	ND	ND	ND	Deep
10	445 S. 10th St.	52	6/93	ND	ND	ND	ND	ND	ND	ND	Intermediate
			2/94	ND	ND	ND	ND	ND	ND	ND	
			5/97	ND	ND	ND	ND	ND	ND	ND	
12	300 S. 11th St.	82	6/94	ND	ND	ND	ND	ND	ND	ND	Deep
13	285 S. 12th St.	83	6/93	ND	ND	ND	ND	ND	ND	ND	Deep
18	189S. 13th St.	40	6/93	ND	ND	ND	ND	ND	ND	ND	Intermediate
20	414 Morton	70	6/93	10.0	ND	ND	ND	ND	ND	ND	Deep
			2/94	12.1	ND	ND	ND	ND	ND	ND	
			4/95	10.2	ND	ND	ND	ND	ND	ND	
			5/97	12.4	ND	ND	ND	ND	ND	ND	
24	611 W. Ash St.	88	6/93	21.0	ND	ND	ND	ND	ND	ND	Deep
			2/94	36.0	0.9	ND	ND	ND	ND	ND	
			4/95	11.3	ND	ND	ND	ND	ND	ND	
25	790 W. Ash St.	47	6/93	ND	ND	ND	ND	ND	ND	ND	Intermediate
26	930 W. Maple St.	46	6/93	ND	ND	ND	ND	ND	ND	ND	Intermediate
27	927 W. Maple St.	85	6/93	ND	ND	ND	ND	ND	ND	ND	Deep
28	595 W. Maple St.	65	6/93	ND	ND	ND	ND	ND	ND	ND	Deep
			2/94	0.7	ND	ND	ND	ND	ND	ND	
			4/95	ND	ND	ND	ND	ND	ND	ND	
			5/97	ND	ND	ND	ND	ND	ND	ND	

Table 2-2

VOLATILE ORGANIC COMPOUNDS RESULTS - DOMESTIC WELLS
LEBANON AREAWIDE GROUNDWATER MONITORING
LEBANON, OREGON

Well #	Well Address	Well Depth in Feet	Well Sampling Date	VOC (EPA Method 8260) Concentrations in µg/L							Water Bearing Zone
				PCE	TCE	TCA	DCE	Trichlorofluoro-methane	Chloroform	Other1	
29	791 Harrison	85	6/93	ND	ND	ND	ND	ND	ND	ND	Deep
42	866 W. Sherman St.	85	6/93	ND	ND	ND	ND	ND	ND	ND	Deep
			2/94	ND	ND	ND	ND	ND	ND	ND	
44	724 W. Vine St.	35	6/93	26.0	ND	ND	ND	ND	ND	ND	Intermediate
45	600 W. Tangent St.	121	2/94	9.8	ND	ND	ND	ND	ND	ND	Deep
48	440 W. Tangent St.	65	2/94	ND	ND	ND	ND	ND	1.0	ND	Deep
49	100 S. Main St.	60	4/95	ND	ND	ND	ND	ND	30.7	1.6	Deep
			5/97	ND	ND	ND	ND	ND	15.0	1.1	
52	Century Park	102	4/95	7.3	ND	ND	ND	ND	ND	ND	Deep
			5/97	4.6	ND	ND	ND	ND	ND	ND	
62	510 S. Mayer St.	110	4/95	ND	ND	ND	ND	ND	ND	ND	Deep
63	500 S. Mayer St.	80	4/95	ND	ND	ND	ND	ND	ND	ND	Deep
64	900 S. Cleveland St.	53	6/93	ND	ND	ND	ND	ND	ND	ND	Deep
65	413 Dodge St.	60	5/94	ND	ND	ND	ND	ND	4.0	ND	Deep
			5/97	ND	ND	ND	ND	ND	4.8	ND	
68	90 N. Park St.	80	6/93	16.0	ND	ND	ND	ND	ND	ND	Deep
			2/94	23.5	ND	ND	ND	ND	ND	ND	
			4/95	23.2	ND	ND	ND	ND	0.8	ND	
71	525 E. Ash St.	133	5/94	ND	ND	ND	ND	ND	ND	ND	Deep
72	145 S. Grove St.	63	5/94	51.0	ND	ND	ND	ND	0.8	ND	Deep
			4/95	72.0	ND	ND	ND	ND	1.2	ND	
			5/97	94.0	ND	ND	ND	ND	0.8	ND	
73	253 S. Grove St.	56	5/94	138.0	ND	ND	ND	ND	2.6	ND	Deep
			4/95	ND	ND	ND	ND	ND	ND	ND	
			5/97	143.0	ND	ND	ND	ND	2.0	0.6	
76	147 S. Main St.	85	5/91	8.0	ND	ND	ND	ND	ND	ND	Deep
			6/93	6.2	ND	ND	ND	ND	ND	ND	
			5/94	7.8	ND	ND	ND	ND	ND	ND	
			4/95	7.1	ND	ND	ND	ND	ND	ND	
80	870 W. Rose St.	80	6/93	ND	ND	ND	ND	ND	ND	ND	Deep
			2/94	ND	ND	ND	ND	ND	ND	ND	
			4/95	ND	ND	ND	ND	ND	ND	ND	
			5/97	ND	ND	ND	ND	ND	ND	ND	
81	142 Elmore St.	109	6/93	ND	ND	ND	ND	ND	ND	ND	Deep
			5/97	ND	ND	ND	ND	ND	ND	ND	

Table 2-2

VOLATILE ORGANIC COMPOUNDS RESULTS - DOMESTIC WELLS
LEBANON AREAWIDE GROUNDWATER MONITORING
LEBANON, OREGON

Well #	Well Address	Well Depth in Feet	Well Sampling Date	VOC (EPA Method 8260) Concentrations in µg/L							Water Bearing Zone
				PCE	TCE	TCA	DCE	Trichlorofluoro-methane	Chloroform	Other1	
82	100 N. 8th St.	105	6/93	ND	ND	ND	ND	ND	ND	ND	Deep
87	Century Park	102	8/90	15.0	ND	ND	ND	ND	ND	ND	Deep
			11/90	9.5	ND	ND	ND	ND	ND	ND	
			12/90	1.6	ND	ND	ND	ND	ND	ND	
			5/91	10.5	ND	ND	ND	ND	ND	ND	
			6/93	9.6	ND	ND	ND	ND	ND	ND	
			2/94	12.0	ND	ND	ND	ND	ND	ND	
			4/95	ND	ND	ND	ND	ND	ND	ND	
89	348 W. Grant St.	85	6/94	232.0	5.9	ND	3.4	ND	1.3	16.2	Deep
			4/95	165.0	ND	ND	4.3	ND	ND	ND	
			5/97	181.0	ND	ND	4.1	ND	1.7	ND	
95	990 W. Academy	92	6/94	ND	ND	ND	ND	ND	ND	ND	Deep
			4/95	ND	ND	ND	ND	ND	ND	ND	
			5/97	ND	ND	ND	ND	ND	ND	ND	
97			4/95	ND	ND	ND	ND	ND	ND	ND	Deep
W2	168 W. Vine St.	75	5/91	45.6	5.0	ND	ND	ND	ND	ND	Deep
			6/93	40.0	5.1	ND	ND	ND	ND	ND	
			2/94	47.0	7.3	ND	2.8	ND	ND	ND	
			4/95	52.0	5.7	ND	2.4	ND	ND	ND	
			5/97	67.5	7.3	ND	2.9	ND	ND	ND	
W3	880 Tangent St.	83	5/91	0.5	ND	ND	ND	ND	ND	ND	Deep
			6/93	0.8	ND	ND	ND	ND	ND	ND	
			2/94	1.2	ND	ND	ND	ND	ND	ND	
			4/95	0.8	ND	ND	ND	ND	ND	ND	
			5/97	0.7	ND	ND	ND	ND	ND	ND	
W4	314 3rd St.	Unknown	12/90	2.5	ND	ND	ND	ND	ND	ND	Deep
			5/91	7.6	ND	ND	ND	ND	ND	ND	(Assumed)
			6/93	12	0.6	ND	ND	ND	ND	ND	
			2/94	17	0.9	ND	ND	ND	ND	ND	
			4/95	11.1	ND	ND	ND	ND	ND	ND	
			5/97	ND	ND	ND	ND	ND	ND	ND	
W5	540 Tangent St.	Unknown	12/90	ND	ND	ND	ND	ND	ND	ND	Unknown
			6/93	ND	ND	ND	ND	ND	ND	ND	
W6	60 Main St.	110	12/90	ND	ND	ND	ND	ND	ND	ND	Deep
			6/93	ND	ND	ND	ND	ND	ND	ND	
			2/94	ND	ND	ND	ND	ND	ND	ND	
			5/97	ND	ND	ND	ND	ND	ND	ND	

Table 2-2

VOLATILE ORGANIC COMPOUNDS RESULTS - DOMESTIC WELLS
LEBANON AREAWIDE GROUNDWATER MONITORING
LEBANON, OREGON

Well #	Well Address	Well Depth in Feet	Well Sampling Date	VOC (EPA Method 8260) Concentrations in µg/L							Water Bearing Zone
				PCE	TCE	TCA	DCE	Trichlorofluoro-methane	Chloroform	Other1	
W7	460 W. Ash St.	65	2/94	80.0	1.5	ND	0.8	ND	0.8	ND	Deep
			4/95	99.0	1.4	ND	0.8	ND	ND	ND	
			5/97	118.0	2.2	ND	1.1	ND	ND	ND	
W8	680 W. Ash St.	18	2/94	ND	ND	ND	ND	ND	0.9	ND	Shallow
			5/97	ND	ND	ND	ND	ND	ND	ND	
W 9	777 W. Ash St.		2/94	ND	ND	ND	ND	ND	ND	ND	Deep
			5/97	ND	ND	ND	ND	ND	ND	ND	
W10	602 W. Ash St.	60	2/94	ND	ND	ND	ND	ND	0.9	ND	Deep
			5/97	ND	ND	ND	ND	ND	ND	ND	
W11	660 W. Ash St.	68	2/94	1.3	2.0	1.0	ND	ND	ND	1.0	Deep
			4/95	ND	ND	ND	ND	ND	ND	ND	
			5/97	3.2	ND	ND	ND	ND	ND	ND	
W12	645 W. Ash St.	68	2/94	ND	ND	ND	ND	ND	ND	ND	Deep
			5/97	ND	ND	ND	ND	ND	ND	ND	
W13	777 W. Vine St.	22	2/94	ND	ND	ND	ND	ND	ND	0.7	Shallow
			5/97	ND	ND	ND	ND	ND	23.3	2.2	
W14	154 S. 6th St.	52	2/94	0.9	ND	ND	ND	ND	ND	ND	Deep
			4/95	ND	ND	ND	ND	ND	ND	ND	
W15	587 Morton	21	2/94	ND	ND	ND	ND	ND	ND	ND	Shallow
W16	45 S. Grove St.	68	2/94	2.8	ND	ND	ND	ND	2.0	0.7	Deep
			4/95	ND	ND	ND	ND	ND	ND	ND	
			5/97	2.3	ND	ND	ND	ND	1.7	ND	
W17	495 W. Ash St.	68	2/94	25.5	0.7	ND	ND	ND	ND	0.9	Deep
			4/95	23.6	ND	ND	ND	ND	ND	0.9	
W18	290 Olive St.	77	2/94	ND	ND	ND	ND	ND	ND	ND	Deep
W19	305 Olive St.	77	2/94	ND	ND	ND	ND	ND	ND	ND	Deep
W20	463 W. Vine St.	17	5/94	ND	ND	ND	ND	ND	ND	ND	Shallow
			5/97	ND	ND	ND	ND	ND	ND	ND	
W21	661 S. Grove St.	134	5/94	ND	ND	ND	ND	ND	ND	ND	Deep
W22	490 E. Rose St.	17	5/94	ND	ND	ND	ND	ND	ND	ND	Shallow
W23	251 E. Oak St.	Unknown	5/94	ND	ND	ND	ND	ND	ND	ND	Unknown
W24	685 B St.	Unknown	5/94	ND	ND	ND	ND	ND	ND	ND	Unknown
W25	195 Hiatt St.	Unknown	5/94	ND	ND	ND	ND	ND	ND	ND	Unknown
W26	875 W. Ash St.	Unknown	4/95	ND	ND	ND	ND	ND	ND	ND	Unknown
J1	465 Hansard	"shallow"	6/94	ND	ND	ND	ND	ND	ND	ND	Shallow
J2	265 S. 13th	Unknown	6/94	1.3	ND	ND	ND	ND	ND	3.1	Unknown
			4/95	ND	ND	ND	ND	ND	ND	ND	
			5/97	0.7	ND	ND	ND	ND	ND	1.7	

Table 2-2

VOLATILE ORGANIC COMPOUNDS RESULTS - DOMESTIC WELLS
LEBANON AREAWIDE GROUNDWATER MONITORING
LEBANON, OREGON

Well #	Well Address	Well Depth in Feet	Well Sampling Date	VOC (EPA Method 8260) Concentrations in µg/L							Water Bearing Zone
				PCE	TCE	TCA	DCE	Trichlorofluoro-methane	Chloroform	Other1	
J3	240 S. 11th	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J5	36802 Hwy. 34	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J6	1910 S. 9th	"shallow"	6/94	2.5	ND	ND	ND	ND	ND	ND	Shallow
			4/95	ND	ND	ND	ND	ND	ND	ND	
J7	885 Tangent St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J9	222 E. Grant St.	25	6/94	ND	ND	ND	ND	ND	1.0	ND	Shallow
J10	1041 W. Oak St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J11	150 S. 11th	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J12	706 E. Oak St.	20-25	7/94	ND	ND	ND	ND	ND	ND	ND	Shallow
J13	435 W. Maple St.	Unknown	6/94	ND	ND	ND	ND	ND	0.8	ND	Unknown
J14	751 W. B St.	Unknown	6/94	3.2	ND	ND	ND	ND	ND	ND	Unknown
J15	1191 S. 5th	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J16	780 Laurel St.	72	6/94	ND	ND	ND	ND	ND	ND	ND	Deep
J17	320 Wheeler St.	Unknown	6/94	ND	ND	ND	ND	ND	3.8	ND	Unknown
J18	811 W. Oak St.	27-41	6/94	ND	1.3	ND	ND	ND	ND	ND	Intermediate
J19	See Well #89			ND	ND	ND	ND	ND	ND	ND	
J20	1185 Hiatt St.	37	6/94	ND	ND	ND	ND	ND	ND	ND	Deep
J22	695 Hiatt St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J23	30 N. Grove St.	Unknown	6/94	1.0	ND	ND	ND	ND	1.9	ND	Unknown
J25	320 11th St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J26	375 12th St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J28	440 Tangent St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J29	445 12th St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J30	467 Mary St.	105	6/94	ND	ND	ND	ND	ND	ND	ND	Deep
J31	453 13th St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
			7/94	ND	ND	ND	ND	ND	ND	ND	
J32	1077 Gilbert Dr.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Deep
J33	860 W. Oak St.	44	6/94	ND	ND	ND	ND	ND	ND	ND	Intermediate
J34	607 E. Oak St.	Unknown	6/94	ND	ND	ND	ND	ND	4.4	ND	Unknown
J36	1055 Tangent St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J37	255 O-Neill St.	24	6/94	ND	ND	ND	ND	ND	ND	ND	Shallow
J39	986 Hiatt St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J40	796 W. Grant St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J41	1490 S. 7th	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J42	817 W. Sherman St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J43	677 W. Vine St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
			5/97	ND	ND	ND	ND	ND	ND	ND	
J44	733 W. Oak St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J45	320 10th St.	60-70	6/94	ND	ND	ND	ND	ND	ND	ND	Deep
			5/97	ND	ND	ND	ND	ND	ND	ND	
J46	550 W. D St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J47	See Well #95	Unknown		ND	ND	ND	ND	ND	ND	ND	Unknown

Table 2-2

VOLATILE ORGANIC COMPOUNDS RESULTS - DOMESTIC WELLS
LEBANON AREAWIDE GROUNDWATER MONITORING
LEBANON, OREGON

Well #	Well Address	Well Depth in Feet	Well Sampling Date	VOC (EPA Method 8260) Concentrations in µg/L							Water Bearing Zone
				PCE	TCE	TCA	DCE	Trichlorofluoro-methane	Chloroform	Other1	
J48	1270 S. 9th St.	Unknown	6/94	ND	ND	1.4	ND	ND	ND	ND	Unknown
			5/97	ND	ND	ND	ND	ND	ND	ND	
J49	307 S. 7th St.	30	6/94	ND	ND	ND	ND	ND	25.9	1.9	Shallow
J50	831 W. Oak St.	Unknown	6/94	0.7	1.0	ND	2.0	ND	ND	ND	Unknown
J51	482 Harrison	21	6/94	ND	ND	ND	ND	ND	ND	ND	Shallow
J52	605 Laurel	70	6/94	ND	ND	ND	ND	ND	ND	ND	Deep
J53	1480 S. 4th St.	55	6/94	ND	ND	ND	ND	ND	ND	ND	Deep
J54	213 E. Grant St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J55	963 Hiatt St.	97	6/94	ND	ND	ND	ND	ND	ND	ND	Deep
J56	746 W. Vine St.	Unknown	6/94	30.9	ND	ND	ND	ND	ND	ND	Unknown
			4/95	18.0	ND	ND	ND	ND	ND	ND	
			5/97	11.0	ND	ND	ND	ND	ND	ND	
J57	850 W. Oak St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J59	371 W. D St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J60	865 W. Grant St.	12	6/94	ND	ND	ND	ND	ND	ND	0.8	Shallow
J61	1071 9th St.	Unknown	6/94	0.6	1.5	ND	5.1	ND	ND	ND	Unknown
J62	915 Tangent St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J64	785 Laurel	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J65	525 Hansard	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J66	511 Hansard	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J68	1010 S. 9th St.	Unknown	6/94	0.7	3.2	ND	9.9	ND	ND	ND	Unknown
J69	350 Wheeler	Unknown	6/94	4.0	0.9	ND	ND	ND	ND	0.6	Unknown
			4/95	ND	ND	ND	ND	ND	ND	ND	
			5/97	7.1	3.4	ND	ND	ND	ND	ND	
J70	1925 S. 9th St.	81	6/94	ND	ND	ND	ND	ND	ND	ND	Deep
J71	355 12th St.	Unknown	6/94	ND	ND	ND	ND	ND	ND	ND	Unknown
J72	111 Hiatt St.	18	6/94	ND	ND	ND	ND	ND	7.5	ND	Shallow
J73	137 Hiatt St.	19	6/94	ND	ND	ND	ND	ND	7.4	ND	Shallow
J74	1051 9th St.	49	6/94	ND	1.3	ND	ND	ND	ND	ND	Unknown
J75	394 12th St.	Unknown	5/97	ND	ND	ND	ND	ND	ND	ND	Unknown
J76	310 S. 13th St.	Unknown	5/97	ND	ND	ND	ND	ND	ND	ND	Unknown

Table 2-3

VOLATILE ORGANIC COMPOUNDS RESULTS - MONITORING WELLS
LEBANON AREAWIDE GROUNDWATER MONITORING
LEBANON, OREGON

Well #	Well Depth in Feet	Well Sampling Date	VOC (EPA Method 8260) Concentrations in µg/L							Water Bearing Zone
			PCE	TCE	TCA	DCE	Trichlorofluoromethane	Chloroform	Other[1]	
MW-1D	89	2/95	ND	ND	ND	ND	ND	ND	ND	Deep
		4/95	ND	ND	ND	ND	ND	ND	ND	
		5/97	ND	ND	ND	ND	ND	ND	ND	
MW-1I	42	2/95	26.9	1.3	ND	0.7	ND	ND	ND	Intermediate
		4/95	18.2	1.0	ND	ND	ND	ND	ND	
		5/97	14.6	0.6	ND	ND	ND	0.6	ND	
MW-1S	22	2/95	ND	ND	ND	ND	ND	ND	ND	Shallow
		4/95	ND	ND	ND	ND	ND	ND	ND	
		5/97	ND	ND	ND	ND	ND	ND	ND	
MW-2D	60	2/95	ND	ND	ND	ND	ND	ND	ND	Deep
		4/95	ND	ND	ND	ND	ND	ND	ND	
		5/97	ND	ND	ND	ND	ND	ND	ND	
MW-2S	30	2/95	2.0	ND	ND	ND	ND	ND	ND	Shallow
		4/95	2.6	ND	ND	ND	ND	ND	ND	
		5/97	2.4	ND	ND	ND	ND	0.7	ND	
MW-3D	75	2/95	17.9	1.7	ND	0.6	ND	ND	ND	Deep
		4/95	14.9	1.4	ND	ND	ND	ND	ND	
		5/97	14.7	1.5	ND	ND	ND	ND	ND	
MW-3I	44	2/95	ND	ND	ND	ND	ND	ND	ND	Intermediate
		4/95	ND	ND	ND	ND	ND	ND	ND	
		5/97	ND	ND	ND	ND	ND	ND	ND	
MW-3S	28	2/95	17.0	ND	ND	ND	ND	ND	ND	Shallow
		4/95	ND	ND	ND	ND	ND	1.3	ND	
		5/97	ND	ND	ND	ND	ND	ND	ND	
MW-4D	73	2/95	36.2	ND	ND	ND	ND	ND	ND	Deep
		4/95	31.4	ND	ND	ND	ND	ND	ND	
		5/97	37.5	ND	ND	ND	ND	ND	ND	
MW-4S	30	2/95	ND	ND	ND	ND	ND	ND	ND	Shallow
		4/95	ND	ND	ND	ND	ND	ND	ND	
		5/97	ND	ND	ND	ND	ND	ND	ND	

Table 2-3

VOLATILE ORGANIC COMPOUNDS RESULTS - MONITORING WELLS
LEBANON AREAWIDE GROUNDWATER MONITORING
LEBANON, OREGON

Well #	Well Depth in Feet	Well Sampling Date	VOC (EPA Method 8260) Concentrations in µg/L							Water Bearing Zone
			PCE	TCE	TCA	DCE	Trichlorofluoromethane	Chloroform	Other[1]	
JW-1	17	5/97	4.8	ND	ND	ND	ND	ND	ND	Shallow
JW-2a	19	5/97	60.0	1.8	ND	6.1	ND	ND	ND	Shallow
JW-2b	19	5/97	19.0	ND	ND	ND	ND	ND	ND	Shallow
JW-3	18	5/97	79.3	2.3	ND	4.5	ND	3.4	ND	Shallow
MWNII-1S	20	5/97	ND	ND	ND	226.0	ND	ND	ND	Shallow
MWNII-6S	20	5/97	-	-	-	-	-	-	-	Shallow
MWNII-7S	21	5/97	-	-	-	-	-	-	-	Shallow

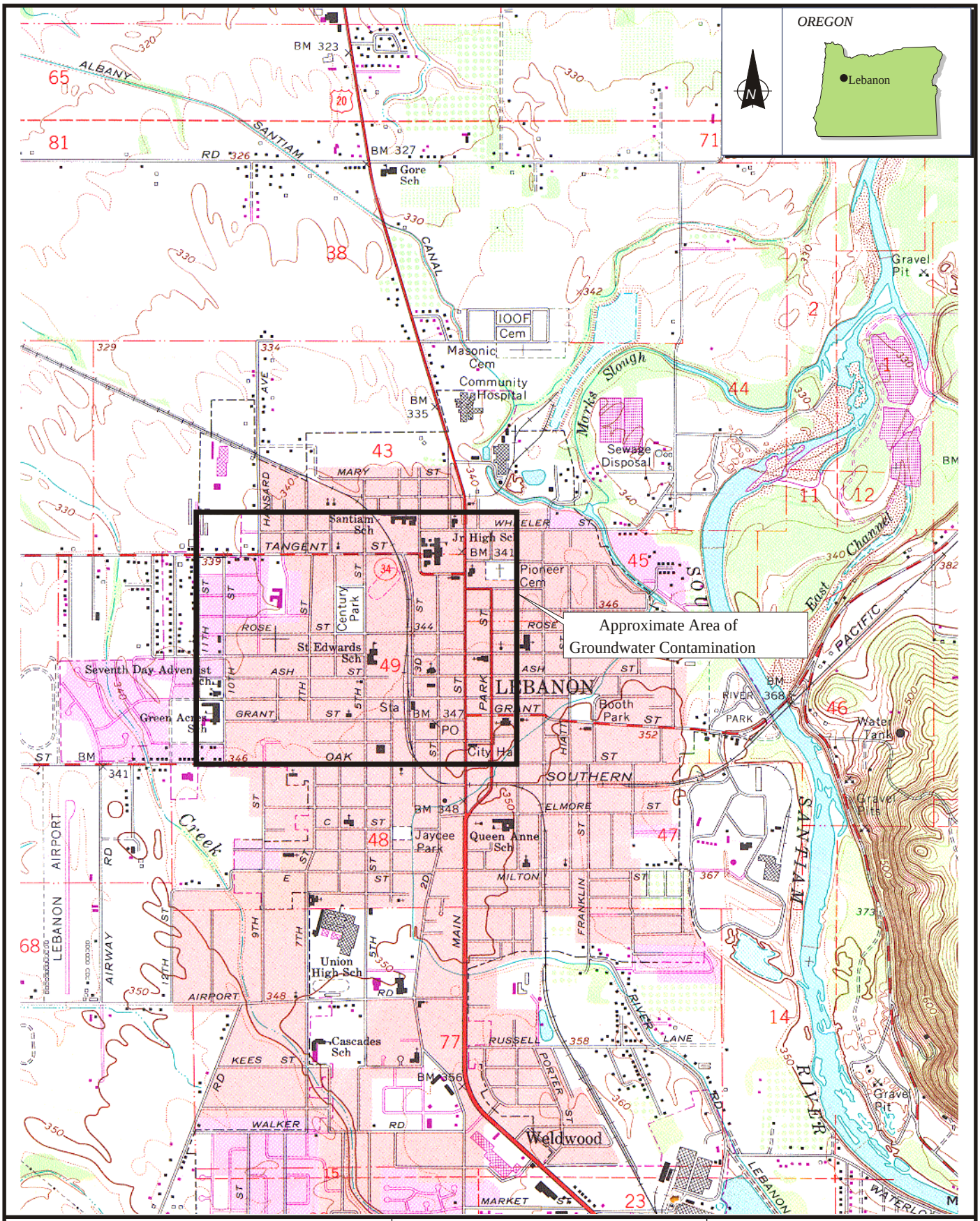
Notes:
1. No compounds other than those listed above were detected.
"-" - Sample was not analyzed due to laboratory error.
ND - Not detected at concentration above method reporting limit.
VOC - Volatile Organic Compound
PCE - 1,1,2,2 - Tetrachloroethylene
TCE - Trichloroethylene
TCA - 1,1,1-Trichloroethane
DCE - cis-1,2-Dichloroethylene

Table 2-4

STODDARD SOLVENT RESULTS - MONITORING WELLS
LEBANON AREAWIDE GROUNDWATER MONITORING
LEBANON, OREGON

Well #	Well Depth in Feet	Well Sampling Date	Stoddard Solvent (DEQ Method NWTPH-HCID) Concentrations in mg/L
MWNII-1S	20	5/97	ND
MWNII-6S	20	5/97	ND
MWNII-7S	21	5/97	560

Notes:
ND = Not detected at concentration above method reporting limit.



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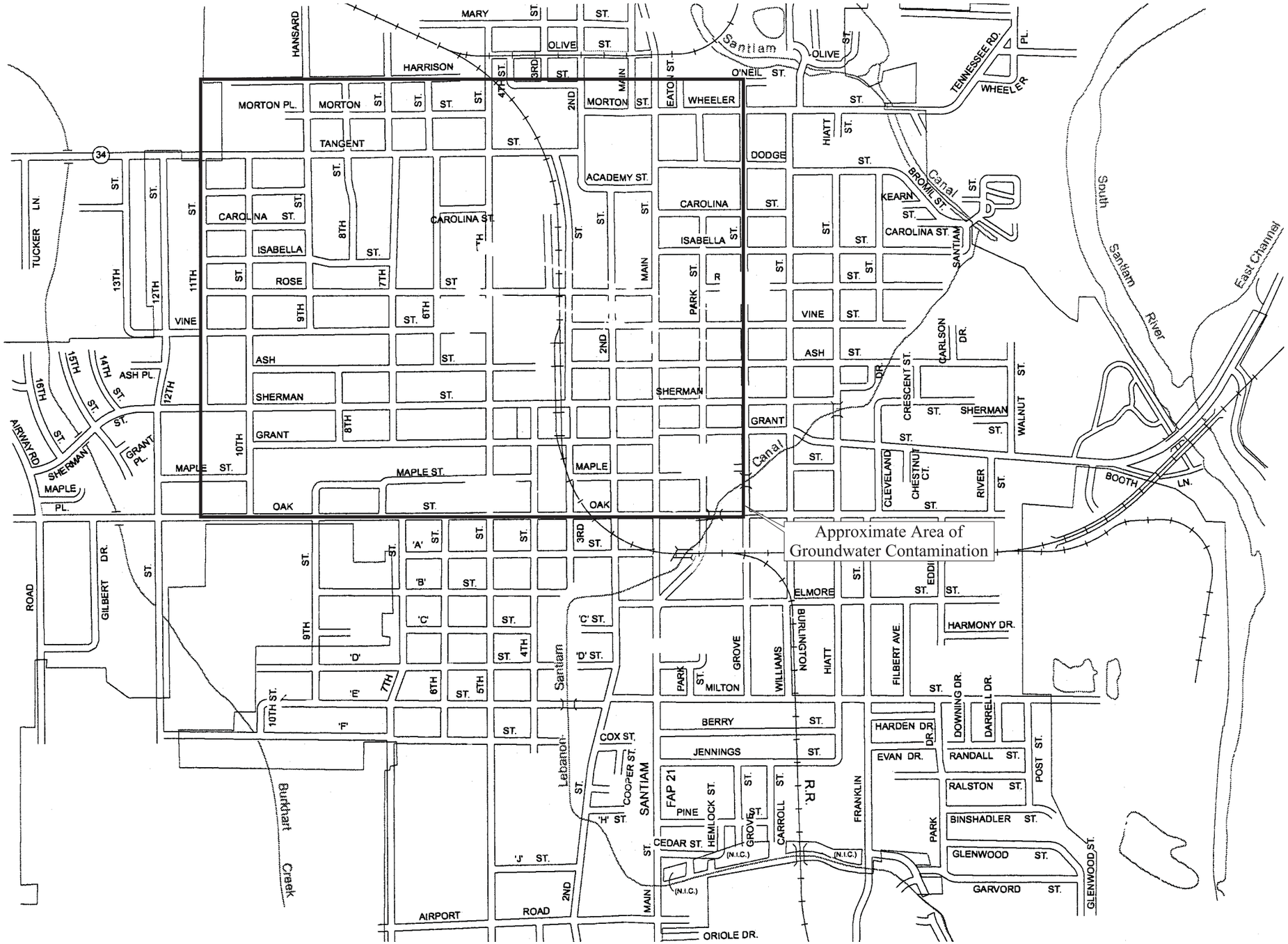
LEBANON GROUNDWATER CONTAMINATION
Lebanon, Oregon

Figure 2-1

SITE LOCATION MAP

Source:USGS, Lebanon, Oregon, 1986
Scale 1:24,000

Drawn:	DATE:	JOB NO.	Dwg.No.
AES	8/12/98	CB0901SIT0	CB0901F1



Base Map Reference: Hart Crowser, 4/98

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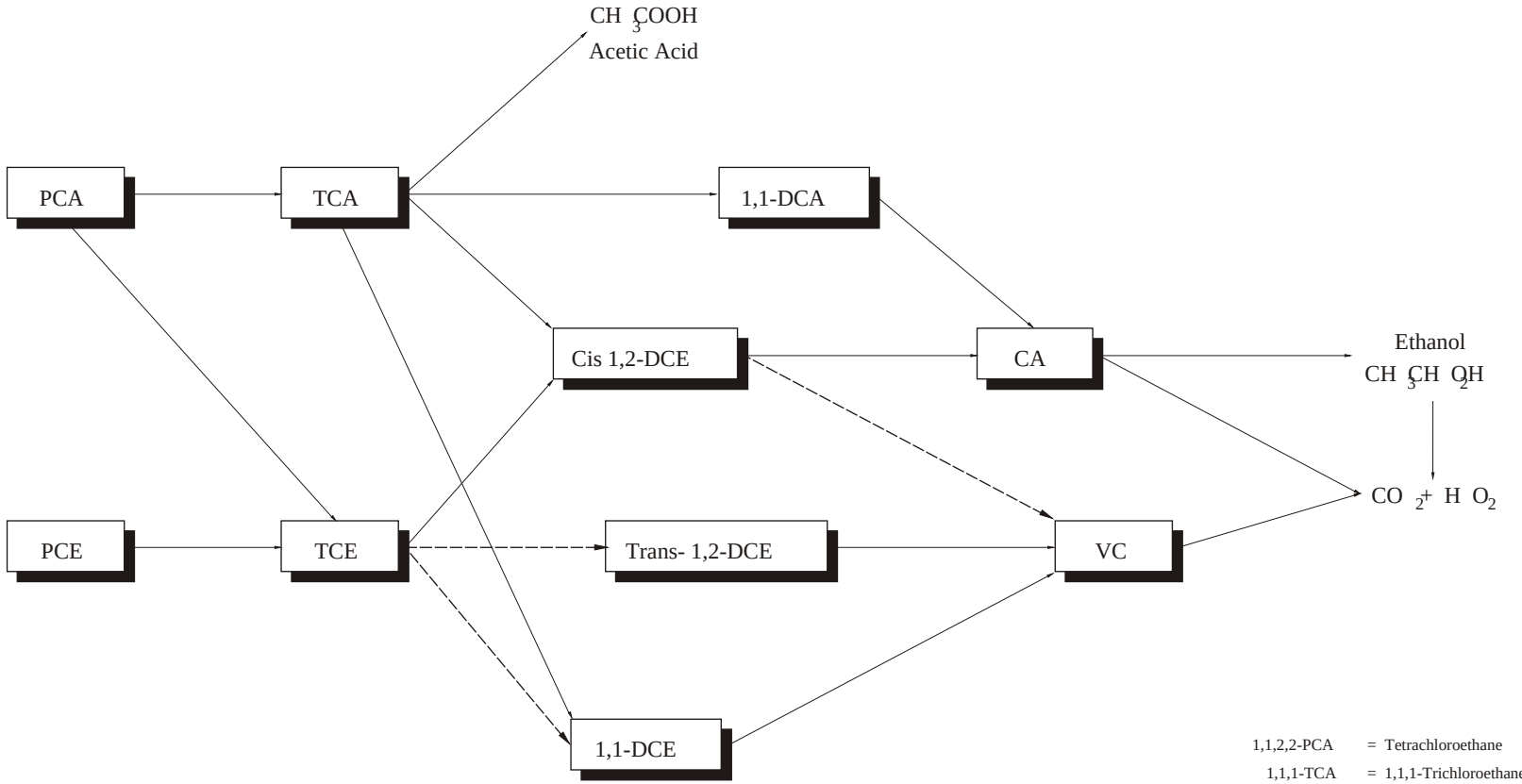
0 1,000 2,000
Approximate Scale in Feet

LEBANON GROUNDWATER CONTAMINATION
Lebanon, Oregon

Figure 2-2
SITE MAP

Date:	Drawn by:	Job No.:	Dwg.No.:
8/17/98	AES	CB0901SIT0	CB0901F6



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Σεαττλε, Ωασηινγτον

ΛΕΒΑΝΟΝ ΑΡΕΑ ΓΡΟΥΝΔΩΑΤΕΡ
ΝΟΝ–ΣΑΜΠΛΙΝΓ ΣΙ
Λεβανον, Ορεγον

Φιγυρε 2–3

ΧΟΝΧΕΠΤΥΑΛ ΤΡΑΝΣΦΟΡΜΑΤΙΟΝΣ ΟΦ
ΧΗΛΟΡΙΝΑΤΕΔ ΑΛΙΠΗΑΤΙΧ ΗΨΔΡΟΧΑΡΒΟΝΣ

Source: Davis and Olsen, 1990, Predicting the Fate of Organic Compounds, Part 2, Hazardous Materials Control, July/August 1990

Drawn By:	Date	TDD/Job No.	Dwg. No.
MRE	8-11-98	CB0901SIT0	CB0901F5

3. AREAS OF CONTAMINATION AND POTENTIAL SOURCES

The most recent groundwater quality data available is for samples collected in May 1997. Based on the limited analytical data available, it appears that the contaminant concentrations in most wells have been relatively consistent over time. However, contaminant concentrations in some wells may be decreasing or increasing slightly in other wells.

In 1994, the DEQ surveyed potential sources of PCE contamination in the Lebanon area. A summary of this survey is included as Table 3-1. Other potential sources, grouped by area of contamination, are listed in the following sections.

3.1 SHALLOW AQUIFER CONTAMINATION AND POTENTIAL SOURCES

The shallow aquifer is characterized by 15 monitoring wells ranging from 17 to 30 feet deep. Table 2-2 summarizes the available laboratory results from the February 1995, April 1995, and May 1997 sampling events for 11 of these 15 wells. Seven of the wells were not sampled prior to May 1997. Laboratory results were not reported for two samples because of a "system failure" as reported by the laboratory. Of the 9 shallow wells for which data is available, 5 were sampled in May 1997 only, and four were sampled additionally in February 1995 and April 1995. Two of the four wells for which historical data are available have consistently been non-detect for VOCs, one well has consistently shown PCE at concentrations below the MCL, and one well has shown a single detection of PCE above the MCL. For the 5 wells that were sampled only in May 1997, PCE concentrations ranged from non-detect to 79.3 g/L, PCE was detected in four samples (three above the MCL), and TCE was detected in two samples at concentrations below the MCL. DCE also was detected at concentrations below the MCL (70 g/L) in the two samples in which TCE was detected. DCE also was detected at 226 g/L in the sample that was non-detect for PCE.

Combining the analytical results from these monitoring wells and from the domestic wells in the Shallow Aquifer indicate three areas of PCE contamination in the downtown area as shown in Figure 3-1.

Shallow groundwater data have defined what appears as one area of chlorinated solvent contamination between Main and Park Streets. The area possibly represents commingled plumes from two or three separate source areas. The northern and southern boundaries of this area appear to be Isabella and "A" Streets, respectively. This area of contamination is designated as Area S-1 on Figure 3-1 (Hart Crowser 1998).

Another area of contamination identified in the shallow aquifer within the downtown area appears to be localized in the area bounded by Elmore, "E", Second, and Main Streets. This area is designated as S-2 on Figure 3-1 (Hart Crowser 1998).

Shallow aquifer contamination has also been identified in what appears to be a small, localized area on the west side of town generally bounded by Rose, Vine, Seventh and Eighth Streets. This area is designated as S-3 on Figure 3-1.

Potential contaminant sources for areas of contamination in the shallow aquifer are listed below (Hart Crowser 1998):

Area S-1

Poly Clean Center (Now Safeway), 70 East Oak Street**;**
Johannsen's Cleaners, 910 South Park Street;
Union Cleaners I, 75 East Grant Street;
NuWay Cleaners I, 585 South Main Street;
NuWay Cleaners II, 581 South Main Street; and
Kwik Klean, 535 South Park Street.

Area S-2

Union Cleaners II, 1220 South Main Street**;**

Area S-3

Two businesses located directly upgradient from Area S-3 have been identified during previous potential-source-location efforts by DEQ. However, a review of DEQ files uncovered no information indicating that either of these businesses had used chlorinated solvents (Hart Crowser 1998).

3.2 INTERMEDIATE AQUIFER CONTAMINATION AND POTENTIAL SOURCES

The intermediate aquifer is characterized by three monitoring wells ranging from 42 to 50 feet deep. Data is available for two of the wells. One well has consistently shown PCE concentrations greater than the MCL and TCE concentrations below the MCL. For the other well PCE and TCE concentrations have been below the detection limit. Laboratory data is available for samples collected in February 1995, April 1995, and May 1997.

The analytical results from domestic and monitoring wells completed in the intermediate aquifer support previous results, indicating the presence of an area of PCE contamination near the monitoring well cluster MW-1. The results for Well 4, located less than two blocks south of well cluster MW-1, showed no detectable contamination (Figure 3-1).

Groundwater quality data for the intermediate aquifer are available for 11 wells on the west side of town. The available data suggest the presence of a contaminant plume generally bounded by Rose, Oak, Sixth, and Third Streets. This apparent plume, identified as Area I-1, appears to correspond closely with an area of contamination identified in the deep aquifer (Area D-4, as discussed below). The potential contaminant source for the intermediate aquifer is listed below (Hart Crowser 1998):

Area I-1

Lebanon Department of Public Works, northwest corner of 4th and Oak Streets.

3.3 DEEP AQUIFER CONTAMINATION AND POTENTIAL SOURCES

The deep aquifer is characterized by four monitoring wells ranging from 60 to 89 feet deep. Two of the four wells have shown PCE concentrations greater than the MCL, with a maximum concentration of 37.5 g/L. For the sampling events for which data are available (February 1995, April 1995, and May 1997), PCE concentrations in these two wells have been consistently above the MCL. Also, one of the deep wells has consistently shown concentrations of TCE below the MCL. These contaminant concentrations in the deep aquifer appear to be consistent over time (Hart Crowser 1998).

The available data for monitoring wells and domestic wells suggest separate areas of contamination in the deep aquifer. These are identified as Areas D-1 through D-5 on Figure 3-1. Area D-1 is approximately bounded by Park, Williams, Wheeler, and Rose Streets; Area D-2 is more or less confined within the block bounded by Grant, Maple, Main, and Park Streets; Area D-3 generally is bounded by Third, Main, Academy, and Ash Streets; Area D-4 is bounded between Rose, Oak, Sixth, and Third

Streets; and Area D-5 is bounded by Eighth, Sixth, Tangent, and Sherman Streets. Areas D-3 and D-4 may commingle or actually define one continuous contaminant plume. The three main areas of PCE contamination in the deep aquifer are D1, D3, and D4.

The area between Third, Sixth, Isabella, and Oak Streets (identified as Area I-1/D-4 on Figure 3-1) appears to represent the area with the highest PCE concentrations in the deep aquifer and the largest apparent plume size. This area corresponds with the intermediate aquifer contamination shown by the data from MW-1I. The shallow source of this plume remains to be identified, and if older, may no longer be apparent in the shallow aquifer. Possible contaminant sources of the deep aquifer are listed below (Hart Crowser 1998):

Area D-1

NuWay Cleaners I, 585 South Main Street;
NuWay Cleaners II, 581 South Main Street; and
Kwik Klean, 535 South Park Street.

Area D-2

Poly Clean Center (Now Safeway), 70 East Oak Street**;**
Johannsen's Cleaners, 910 South Park Street;

Area D-3

Alley's Truck and Auto Parts, 125 West Sherman Street; and
Lebanon Department of Public Works, Northwest Corner of 4th and Oak Streets (see Area D-4, below).

Area D-4

Lebanon Department of Public Works, Northwest Corner of 4th and Oak Streets.

Area D-5

See Area S-3, Above.

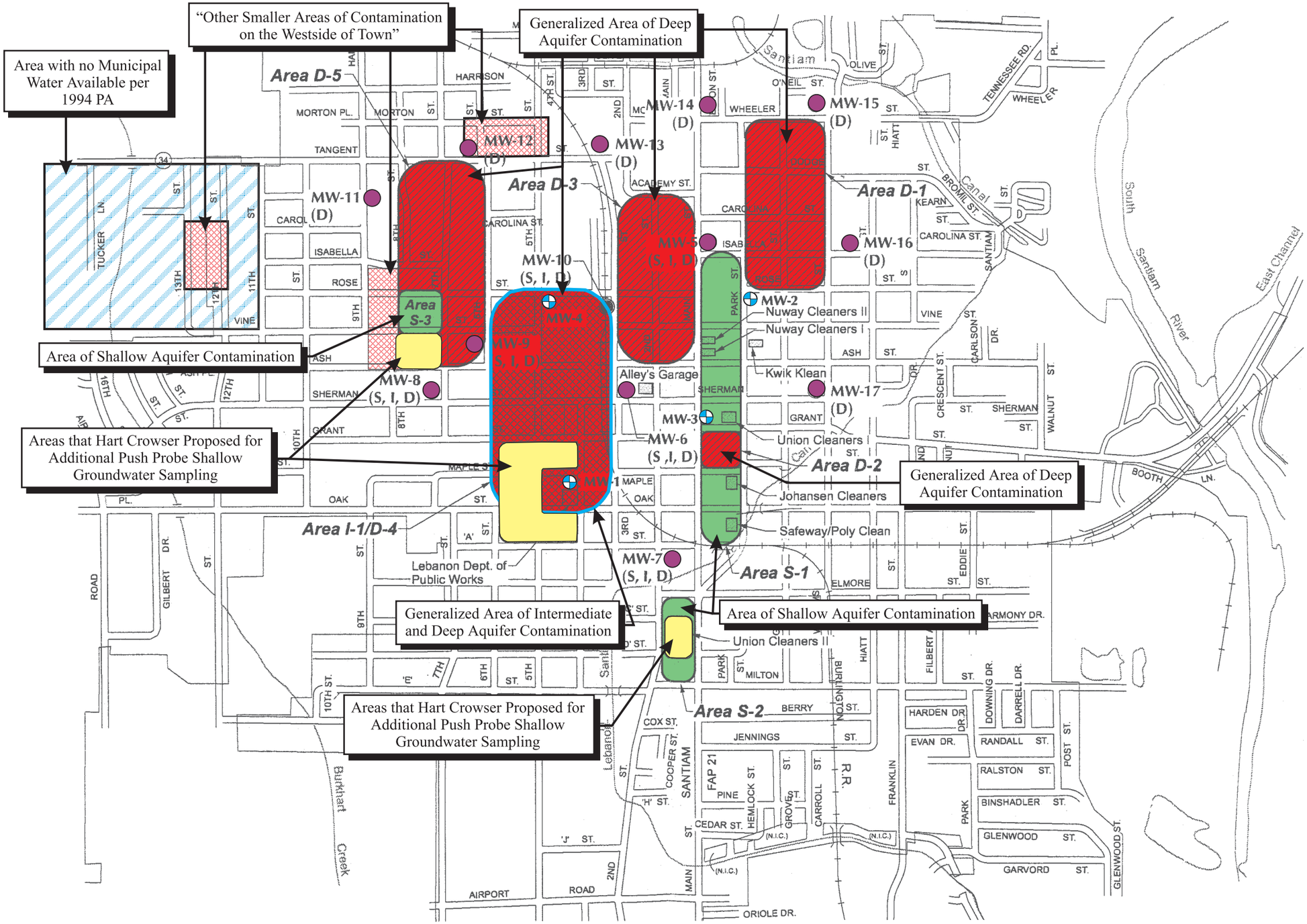
3.4 OTHER AREAS OF CONCERN

Other smaller areas of contamination on the west side of town include:

Between Seventh, Nnth, Sherman, and Rose Streets;

Between 12th, 13th, Carolina, and Rose Streets; and
North of Tangent between Fifth and Sixth Streets.

Of these, the area between 12th, 13th, Carolina, and Rose was identified for the first time during the May 1997 monitoring event and is located within an area described in the *1994 Preliminary Assessment* (ODEQ 1994) as residential and without municipal water service. The possible contaminant sources in these areas have not been identified.



KEY:

- Existing Cluster Monitoring Well Location and Designation
- Proposed Monitoring Well Location Designation (notation indicating shallow, intermediate, and/or deep installation)
- Area of Shallow Aquifer Contamination
- Generalized Area of Intermediate and Deep Aquifer Contamination
- Generalized Area of Deep Aquifer Contamination
- "Other Smaller Areas of Contamination on the Westside of Town"
- Area with no Municipal Water Available per 1994 PA
- Areas that Hart Crowser Proposed for Additional Push Probe Shallow Groundwater Sampling

Base Map Reference: Hart Crowser, 4/98

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0 1,000 2,000
Approximate Scale in Feet

LEBANON GROUNDWATER CONTAMINATION
Lebanon, Oregon

Figure 3-1
GENERAL AREAS OF CONTAMINATION

Date:	Drawn by:	Job No.:	Dwg.No.:
8/12/98	AES	CB0901SIT0	CB0901F4

4. MIGRATION/EXPOSURE PATHWAYS AND TARGETS

The following sections describe the migration/exposure pathways and potential targets within the sites range of influence (Figure 4-1).

4.1 GROUND WATER MIGRATION PATHWAY

The City of Lebanon is in the alluvial flood plain of the South Santiam River. Portions of the subject area have 0 to 2 feet of topsoil and fill gravel (PRC 1994). Below the topsoil lies a recent alluvium that consists of interbedded sand, gravel, and clay that are partially oxidized and cemented (PRC 1994). The recent alluvium, present within 1.0 to 1.5 miles of the South Santiam River, is 0 to 50 feet thick (PRC 1994); and, in some locations, has silt interbeds sufficiently extensive and impermeable to create localized areas of perched groundwater (Hart Crowser 1998).

At the base of the recent alluvium is a clay and silt layer that separates it from the older alluvium that underlies it. The older alluvium deposit is 100 to 180 feet thick and consists of linticular beds of sand, gravel, clay, and silt. The gravel deposits in the older alluvium are generally similar to those of the younger alluvium, but finer and less extensive (ODEQ 1994), which may account for the lower permeability in this unit (PRC 1994B). However, in the Lebanon area, the older alluvium contains a high proportion of sand and gravel and generally is, highly permeable (ODEQ 1994). The thickness of the older alluvium is highly variable and often reflects irregularities in the sedimentary bedrock surface . In many instances, a layer of blue clay (reportedly thick in some locations) separates the older alluvium from the marine sedimentary bedrock below. The marine sedimentary rocks consist of sandstone, shale, and tuff and can be as thick as 2,000 feet. At depth, the sedimentary rocks yield only small quantities of mineralized groundwater.

Hydrogeology

The younger alluvium is typically in hydraulic connection with the South Santiam River, discharging to the river during the winter months, and being recharged by the river during the summer months (ODEQ 1994).

Clay layers of variable thickness separate the older and younger alluviums. The older alluvium has been observed to behave as either a semi-confined or unconfined aquifer. Presumably, clay confining layers can be completely absent from some areas with the older and younger alluvium being interconnected. Based upon previous sampling, similarities in ionic compositions of groundwater from the two aquifers also suggest that the two aquifers are probably interconnected in Lebanon. In some instances, well casings have been perforated to allow withdrawal of groundwater from both the younger and older alluviums. An example would be the Century Park irrigation well. Such wells provide an excellent interconnection between the two aquifers (ODEQ 1994).

In the Lebanon area, average specific groundwater yield tends to decline slightly with increases in well depth. Specific capacities of wells in the younger alluvium, however, tend to be lower than those of wells in the older alluvium because of generally thinner formations (ODEQ 1994).

Both the younger and older alluvium aquifers are predominately recharged by rainfall/snowfall during the wetter months (October through May). During the drier summer months, the South Santiam River is presumed to be the major recharge source for the younger alluvium. The unlined Lebanon-Santiam Canal is probably also a losing stream during the summer months (ODEQ 1994).

Vertical gradients in the study area appear to be consistently downward. The average gradient between the shallow and deep aquifers is about 20 times greater than the horizontal gradient in either aquifer (ODEQ 1994; Hart Crowser 1998).

Based on data from previous investigations (PRC 1993, 1994a, 1994b, 1995, and DEQ 1994), the horizontal component of groundwater flow in the shallow aquifer (younger alluvium) is to north-northwest. The horizontal component of groundwater flow in the deep aquifer (older alluvium) is generally to the north, with a slight northwesterly component in the southern and western portions of the study area (Hart Crowser 1998).

Average annual precipitation has historically ranged between about 39 and 45 inches. Most of the total precipitation (80%) falls between the months of October and May (as rainfall), providing a moisture surplus of about 27 inches. Very little precipitation falls between mid-June and early September. Evapotranspiration during this period typically creates a moisture deficit of about 13 inches (ODEQ 1994). Surface drainage near Lebanon generally is to the north and northwest (ODEQ 1994).

The occurrence and flow of groundwater in both the older and younger alluvium generally is the same. The depth of groundwater typically ranges from 8 to 15 feet below the ground surface. The

groundwater level may vary by 3 to 8 feet depending on seasonal variations in precipitation and groundwater pumping. Aquifers in the younger and older alluvium are typically unconfined to semi-confined and are in hydraulic connection with the surface. Groundwater flow is generally northward in alluvial deposits that are within 1.5 miles of the South Santiam River. Groundwater flow is to the northwest in alluvium west of Lebanon (PRC 1993).

The principal water-bearing strata in the study area are gravel layers in the older alluvium. These gravel layers are interconnected and form a thick gravel aquifer, interbedded with many sand, silt, and clay layers. The depth of the gravel layers varies from about 50 to 70 feet, 90 to 100 feet, and 150 feet below ground surface. These layers are generally continuous, with thicknesses ranging from 3 to 10 feet. The thickness of the gravel layers increases toward the north and west of Lebanon. The gravel deposits of the older alluvium are overlain by a sequence of silts and clays that separate this deeper aquifer from the shallow aquifer and may slow the migration of water and contaminants to the underlying gravel aquifer (PRC 1993).

The younger alluvium is characterized by discontinuous layers and lenses of coarse sand and gravel. These deposits are found about 10 to 50 feet below the ground surface and range from about 3 to 6 feet thick. The primary water-bearing zones are in sand and gravel layers and lenses (PRC 1993).

4.2 GROUNDWATER TARGETS

Approximately 1,721 domestic wells are located within 4 miles of the site (ODEQ 1994; GRID 1998). There are approximately 76 well logs for the 0.4-square-mile groundwater contamination area as defined in the 1994 preliminary assessment (ODEQ 1994). Based on the Oregon average of 2.52 residents per household (ODEQ 1994), approximately 192 people consume groundwater within the 0.4-square-mile area.

Three public drinking water wells are located within 1 to 2 miles of the site. Two of the wells are operated by the Santiam Village Mobile Home Park. The manager reports that the wells serve 80 people (Frye 1998). The remaining well in this distance ring is operated by D & J Water Systems and serves 45 people (EPA 1998).

Four public drinking water wells are located within 2 to 3 miles of the site. Wells owned by the Lawrence Water Company and Fir Grove Trailer Court supply water to 100 and 80 people, respectively.

Two wells owned by Halcyon Mobile Home Park serve a total population of 100 (EPA 1998). Populations using groundwater for drinking water are summarized in Table 4-1.

Water well records for these public drinking water wells were not available from the Oregon Water Resources Department. Their Groundwater Resource Information Distribution system was accessed and the data base was searched for all community wells within the appropriate townships, ranges, and sections. The data base was also searched, within Linn County, based on the owners names (such as Halcyon Mobil Home Park, Fir Grove Trailer Court, etc.) and possible variations of owners names. These searches returned no record of community well logs within the 4-mile target distance limit.

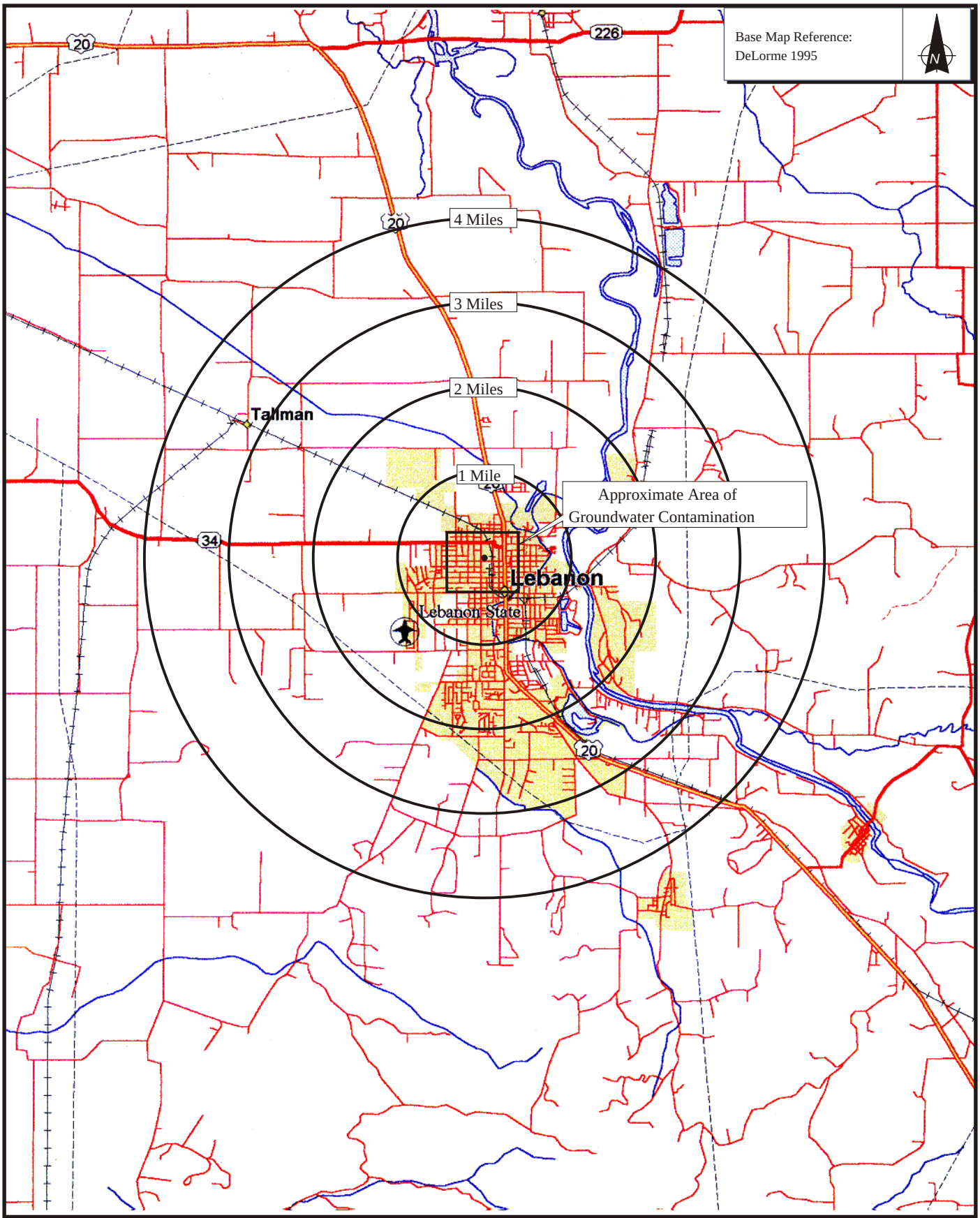
Examination of the City of Lebanon's maps of water service connections suggests that as many as 40 households (101 people) within the 0.4-square-mile groundwater contamination area may be totally dependant on groundwater for their drinking water source (ODEQ 1994). The same report indicates that a municipal water supply does not appear to be available to most homes to the northwest (generally downgradient) of the 0.4-squar-mile groundwater contamination area (ODEQ 1994). There are approximately 75 households (189 individuals) residing within the 0.1-square-mile area bounded by Eleventh Street, West Vine Street, Sunset Road, and West Tangent Street that have no access to municipal water (ODEQ 1994). A review of recent water service connections, by the City of Lebanon's Public Works Department, indicates that additional water service connections have been made in both of these areas since 1994 (Kent 1998).

Table 4-1

GROUNDWATER DRINKING WATER POPULATION WITHIN A 4-MILE RADIUS
LEBANON AREA GROUNDWATER
LEBANON, OREGON

Distance (Miles)	Number of Private Wells	Average Number of Persons/ Household	Persons served by Private Wells (a)	Persons served by Public Wells (b)	Total Population per Distance Ring (a) + (b)
0 - ¼	15	2.52	37.8	0	37.8
¼ - ½	42	2.52	105.84	0	105.84
½ - 1	107	2.52	269.64	0	269.64
1 - 2	467	2.52	1,176.84	125	1,301.84
2 - 3	497	2.52	1,252.44	280	1,532.44
3 - 4	593	2.52	1494.36	0	1,494.36
Total					4,741.92

Source: EPA 1998; GRID 1998; Frey 1998



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LEBANON GROUNDWATER CONTAMINATION
Lebanon, Oregon

Figure 4-1
4-MILE MAP

0 .8 1.6
Approximate Scale in Miles

Drawn:	DATE:	JOB NO.	Dwg.No.
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5. SUMMARY AND CONCLUSIONS

5.1 SUMMARY

The START has conducted an NSSI for the Lebanon Area Groundwater site located in the northwest portion of Lebanon, Oregon. This NSSI consisted of reviewing and summarizing available documents pertaining to the investigation of groundwater contamination in the northwest portion of Lebanon.

Over the past eight years (since 1990), a multitude of studies have been performed in the Lebanon area to determine the nature and extent of groundwater contamination. The primary contaminants of concern are halogenated solvents, specifically PCE which has been used in the dry cleaning industry, in the carpet cleaning industry, and in a variety of other industries to clean and degrease metal and electrical parts.

Lebanon lies within the alluvial plain of the South Santiam River. Groundwater occurs below northwest Lebanon in shallow, intermediate, and deep aquifers. The shallow and deep aquifers are continuous over the study area, while the intermediate aquifer is laterally discontinuous. Many areas of contamination within the northwestern part of Lebanon have been defined or partially defined. These include three areas of groundwater contamination in the shallow aquifer, one area in the intermediate aquifer, five areas in the deep aquifer, and three other areas of concern. A total of 252 groundwater samples have been collected from 147 domestic wells and monitoring wells since 1990. PCE was detected in 97 samples; in 67 of those samples PCE was present above the maximum health-based concentration of 5.0 g/L. For samples with detected PCE, the average concentration was 30.3 g/L. Laboratory data for the most recent sampling event (May 1997) indicate that the PCE concentration is greater than the current drinking water standard of 5.0 g/L for groundwater samples collected from nine domestic drinking water wells. Based on information provided by well owners, four of these nine wells are used for drinking water. PCE concentrations for these wells (72, 73, W2, and W17) were 94.0, 143.0, 67.5, and 23.6 g/L, respectively.

Many industries and businesses that use or may use PCE have been identified in the Lebanon area. The 34 businesses and industries historically known to use PCE were described in Section 3. Twenty three of these businesses were described by ODEQ in their 1994 preliminary assessment and are summarized in Table 3-1 (ODEQ 1994). Eleven of these businesses were identified as potential sources in the 1997 report for Areawide Groundwater Monitoring (Hart Crowser 1998).

A consultant to ODEQ has identified three areas where additional shallow groundwater investigations may provide useful data, but where installation of intermediate or deep monitoring wells may not be warranted. They have recommended completing push probe, shallow aquifer groundwater sampling in these areas, as shown in Figure 3-1 (Hart Crowser 1998).

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